

## Remarks

### Introduction

Claims 1-27 stand rejected under 35 USC 103(a) as unpatentable over Golovanivsky ("Golo") in view of Newman.

### The Prior Art

Golo focuses on an irradiation apparatus of a large size and scale suitable for use in a processing or packaging plant. Golo's device includes a multiplicity of x-ray sources, each having a volume of about one liter. In one embodiment, the food passes along a series of conveyor belts, each having separate irradiation chambers and shielding. In the embodiment of Figure 11, Golo discloses a "small scale" apparatus which "can be installed on the bed of a large truck or trailer" which can be driven to different production locations. This device includes one or more blocks of twenty four radiation sources having a conveyor length of twenty five meters. Along these lines, and as noted by the Examiner, Golo also mentions that the device could be configured for use in a batch, rather than in a continuous processing mode. *See generally* Figs. 8-11 and accompanying text.

While Golo's device is intended to irradiate large quantities of food (for example 1kg of chicken every 10 seconds) in a production environment, it takes a relatively long time to irradiate a given article. Using Golo's 25 meter conveyor length and 1 cm/sec conveyor speed, it takes about 42 minutes to irradiate a given object. *See* Col. 10:9-13.

In contrast to Golo, Newman discloses a small-scale device which uses UV radiation. Newman's UV radiation is unable to penetrate foodstuffs to any substantial degree. As a result, Newman is confined to sterilization of regions at or near the food surface.

Moreover, Newman teaches that the UV radiation should be generally uniform within the treatment cavity. To this end, Newman uses a number of UV tubes (preferably at least 4, but more preferably six or eight) surrounding the object to be irradiated. Moreover, the surfaces of the inner walls are highly reflective to UV radiation. *See, e.g.*, Figs. 4, 6, and 7; col. 3:8-24.

### **The Claimed Invention**

The office action states that Golo discloses a food irradiation apparatus using a first x-ray generator, a support and a chamber to hold food for exposure to irradiation, but does not disclose a rotating support. The office action also states that Newman discloses a rotating support. According to the office action, it would have been obvious to modify Golo to provide a rotating support to irradiate all the desired portions of a food for complete irradiation as taught by Newman.

Independent **claims 1 and 18** have been amended to include an irradiation chamber sized to receive a quantity of food typically encountered at or near the point of consumption. Independent **claim 12** has been amended to include an irradiation chamber having a volume less than about 2 cubic feet. As previously presented, independent **claim 22** is directed to a method of irradiating a quantity of food typically encountered in the home.

As noted above, Golo is directed to large, truck-size irradiation device having numerous radiation sources for irradiating large quantities of food at or near the point of production. Newman is directed to a small-scale UV device which provides only surface sterilization. Modifying Golo's device to include Newman's turntable as suggested by the office action would still result in a large scale device, in contrast to a device having an irradiation chamber of a size required by independent claims 1, 12, 18, and 22. For at least this reason, it is submitted that these claims distinguish patentably over the prior art of record.

Because Golo, Newman, and the present invention each have substantially different purposes, there is also no suggestion or motivation to combine the references to arrive at the claimed invention. Golo is directed to a device for large scale food irradiation at or near the point of production. Newman's device is limited to the small-scale surface sterilization. In contrast, the invention of claims 1, 12, and 22 is directed to the irradiation of food in quantities typically encountered at or near the point of consumption. Similarly, claim 18 is directed to a device having an irradiation chamber having a volume less than about 2 cubic feet.

Even putting aside the differences of scale, these disparate purposes preclude the combination of Golo and Newman for yet other reasons. Food irradiation as practiced by Golo requires that the dose be distributed throughout the volume of the food. Newman, by contrast, is

limited to surface sterilization. It is not obvious to one skilled in the art that Golo's device, if modified to include Newman's turntable, will provide the required dose distribution. Moreover, the number of radiation sources and the arrangement in relation to a rotating support needed to provide the required dose distribution are anything but obvious. This is especially true because the radiation sources disclosed in Golo and Newman are much different – they have substantially different radiation (e.g., x-ray v. UV) and emission (e.g., substantially equatorial v. cylindrical with UV reflective cavity walls) characteristics.

It is submitted that dependent **claims 13, 14, and 23** distinguish patentably over the prior art for at least the foregoing reasons, together with their dependency from their respective independent claims.

Turning now to dependent **claims 2 and 24**, the office action states that the source is disposed axially. Given the disparate radiation and emission characteristics of Golo and Newman, it is again submitted that it is not obvious to position the sources as required by these claims. For at least the foregoing reasons, together with their dependency from their respective independent claims, it is submitted that these claims are likewise directed to allowable subject matter.

In regard to **claims 3-10, 15-17, 19-21, and 25-27**, the office action states that the combined art teaches the use of a plurality of sources positioned in appropriate locations.

**Claims 6, 7, 16, and 27** have each been placed in independent form without substantive amendment. Claims 6, 16, and 27 require that the distance between an x-ray source and the support be adjustable; claim 7 requires that the distance between the axis of rotation and the x-ray source be adjustable, in each case as is spelled out in the claim. Dependent **claim 9** requires that the distance between the x-ray source and the axis of rotation be adjustable; dependent **claim 10** requires that the relative position of the food and radiation source be adjustable in a direction parallel to the axis of rotation. Neither Golo nor Newman disclose or suggest such adjustability - in each case, the distance between the radiation sources and their respective conveyors or turntables is fixed. Accordingly, the office action fails to establish a *prima facie* case of obviousness in regard to these claims.

**Claim 17** has been placed independent form without substantive amendment. This claim requires, among other things, a sensor for determining a dimension of the object to be irradiated. Neither Golo nor Newman disclose or suggest such a sensor. Accordingly, the office action fails to establish a *prima facie* case of obviousness in regard to this claim.

Dependent **claims 3-5, 8, 15, 19, 25, and 26** are each directed to the use of additional sources and/or the positioning of the source(s), all as specified in the respective claims. As noted above, the radiation sources disclosed in Golo and Newman are substantially different -- they have substantially different radiation (e.g., x-ray v. UV) and emission (e.g., substantially equatorial v. cylindrical with UV reflective cavity walls) characteristics. In view of these differences, the use and/or positioning of the sources as required by the present claims is not obvious in view of the cited references. For at least the foregoing reasons, together with their dependency from their respective claims, it is submitted that these claims are directed to allowable subject matter.

Dependent **claim 21** requires an operator input device for identifying the type of food. As such a device is neither disclosed nor suggested by Golo or Newman, the references cited in the office action fail to establish a *prima facie* case of obviousness in relation to this claim.

As previously presented, dependent **claim 11** (which depends from claim 1) requires a means for determining the dimension of a container supported by the support. **Claim 27** has been placed in independent form without substantive amendment. This claim requires, among other things, determining a dimension of the food and adjusting the relative positions of the food and the x-ray source based on the dimension. The office action states that Golo discloses the related dimensions at Col 7:45 *et seq.* These dimensions are the size of Golo's x-ray source. Golo fails to disclose or suggest a means for determining the dimension of the food container, determining a dimension of the food, or adjusting the relative positions of the food. Accordingly, the references cited in the office action fail to establish a *prima facie* case of obviousness in relation to these claims.

New dependent **claims 28-34** have been added. It is submitted that these claims are allowable at least by virtue of their dependency from their respective independent claims.

New claims **35-38** have also been added.

**Claim 35** is directed to a food irradiation apparatus having an x-ray source and a rotating support disposed in proximity to the x-ray source. The apparatus is sized to support a quantity of food typically encountered at or near the point of consumption. Rotation of the support causes successive portions of the food to be exposed to the radiation beam. The apparatus irradiates the quantity of food in a time frame comparable to conventional microwave cooking.

**Claim 37** is directed to an irradiation apparatus which includes a rotating support sized to support a quantity of food typically encountered at or near the point of consumption and a first source of ionizing radiation. Rotation of the support improves a uniformity of the radiation does received by the object. The apparatus irradiates the quantity of food in a time frame comparable to conventional microwave cooking.

Claims 37 and 38 both require that the device irradiate the food in a time frame comparable to conventional microwave cooking. In this regard, it should be noted that Golo envisions a device which needs some 42 minutes to irradiate an object. In contrast to volume irradiation, Newman is limited to surface sterilization.

Dependent **claims 36 and 38** state that the quantity of food is 1kg of unfrozen red meat and the timeframe is about five minutes.

For at least the reasons set forth above, it is submitted that claims 1-38 distinguish patentably over the prior art of record.

### **Drawings**

The Notice of Draftsperson's Review (PTO-948) has not been received. An indication that the drawings are acceptable is requested.

### **Miscellaneous**

The Examiner's attention is directed to item C of the Examiner's PTO-892. It is believed that this reference corresponds to US Patent No. 6,006,659 issued 28 Dec 99 to Rosenthal, a copy of which was included with the office action. It is requested that the Examiner update this information as needed so that the reference is printed on the front page of the patent.

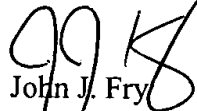
Appl. no. 10/003,668  
Amdt. dated 17 Sep 03  
Reply to office action of 18 Jun 03

This amendment presents a 6 new independent and 11 new total claims. A check in the amount of \$351 (taking into account small entity status) is enclosed.

### **Conclusion**

It is submitted that the present application is in condition for allowance. An early indication of allowability is earnestly solicited.

Respectfully submitted,



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